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## OFFICIAL STATISTICS.

THE statistics of manufactures and of wealth as published at the Eleventh Census are frequently criticised as in a large part worthy of no confidence whatever, and, instead of promoting an intelligent understanding of social conditions, have chiefly served to mislead.

While these statistics are fully explained in the official reports and the totals there given are a true presentation of the facts, the continued reiteration of the statement that the true facts have not been shown is liable to mislead those who have not the time or the inclination to study the voluminous reports.

It will be my endeavor to so present the truth in regard to the statistics relating to manufactures that their value and utility may be fully appreciated.

It has been the aim of the superintendent of each census to secure a complete report for each branch of statistical inquiry. Of the numerous investigations undertaken those pertaining to population, agriculture, and manufactures have always ranked first, and every effort has been made to obtain a complete report concerning them, even if it necessitated the neglect or abandonment of other inquiries. Therefore the total of manufactures published at each census presents as nearly as possible the true total for the products of industry. In this the Eleventh differed in no respect from prior censuses, and on this theory it is perfectly proper to compare the results. Speculation as to the omissions, incomplete canvass, etc., cannot be relied on to correct these totals, which are the results of a personal canvass and the application of the best statistical methods known at the time.

The criticism of the totals of the Eleventh Census has invariably been that they are too large : that they were so swollen by the complete canvass and the inclusion of industries not before enumerated that they show an abnormal increase. The totals cannot be too large to present the true facts at each period

unless there has been fraud perpetrated, and that charge has not been seriously made.

During the preparation of the final reports of the Eleventh Census a careful examination and comparison were made of the totals for each industry as published at the censuses of 1870, 1880, and 1890. This comparison developed the fact that certain industries, such as dressmaking, bottling, millinery, cars and general shop construction, and repairs by steam railroads, manufacture of gas, etc., had apparently been included in the total of 1870, but in 1880 they had either been omitted or the reports classified with other industries in such a manner that it was impossible to identify them. These industries were enumerated, and their total, amounting to \$315,672,287 in value of product, deducted from the grand total of 1890, gives a result that was possibly a truer comparison with totals for 1880.

This disposes of the criticism as to the inclusion of industries not previously canvassed. There was no attempt to conceal the fact that they were probably not included in 1880, although they had been reported in 1870, and it was evidently the intention in 1880 to make as complete a canvass as that of ten years previous. But the omission or inclusion of these minor industries in the total of nine billion as compared with five billion can have but slight effect.

As to the more thorough enumeration in 1890. It is possible that the methods adopted in 1890 did result in a fuller report for certain industries, especially those coming under the head of hand trades. But the schedule of inquiry used in 1890 was more conducive to the omission of the large establishments by the enumerator than was that used in 1880. In 1890 a separate schedule, with in the neighborhood of 100 inquiries, was used for each establishment. In the majority of cases it required a special visit from the enumerator to secure this schedule. In 1880 there were only eight or ten questions asked, and a large number of establishments reported in the same schedule; the schedules were, therefore, secured by the enumerator at the same time he gathered the statistics of population.

That there were establishments omitted from the canvass at each census cannot be denied. The omissions in 1890 are referred to in the reports. The extent of these omissions at prior censuses no one can determine. I, however, have an idea of the extent of the omissions in 1890, and recall the fact that some of the largest ship-building establishments of the country, some of the largest sugar refineries, paper mills, cigar factories, and establishments engaged in other industries, absolutely refused, or willfully neglected, to furnish the information required for the census. A number of cases were referred to the Attorney General to institute legal proceedings in order to secure the data, but the suits were abandoned, for various reasons, among others because the information could not be secured in time to be included in the reports. While the omission of these establishments may not materially affect the totals, they undoubtedly offset the inclusion of the minor industries referred to, and tend to counterbalance the results of the more thorough canvass.

The establishments of productive industry being largely concentrated in cities, a special effort was made at both the Tenth and Eleventh Censuses to make a complete canvass of the cities. It is in the cities, if anywhere, that the canvass of 1890 is more complete than that of 1880, for I am confident that in the rural districts, as a whole, the canvass of 1880 resulted in securing a larger number of reports than did that of 1890. A greater number of cities were especially canvassed in 1890, and this with their possibly better canvass accounts for any increase that may be due to the character of the enumeration.

The extent that the possibly better canvass of the cities has affected the grand totals cannot be determined. The only industries that could be perceptibly affected are those generally conducted in small establishments, such as carpentering, blacksmithing, tailoring, etc. In these industries a very large number of establishments control but a very small percentage of the total product for all industries. The canvass for the large establishments was in all probability as thorough throughout the entire country in 1880 as in 1890. In view of these facts it is absurd to

say that the more thorough canvass, or the inclusion of additional industries, has destroyed the utility of the totals of 1890 for the purposes of comparison with 1880.

It is asserted that the schedule of inquiry used in 1890 was so entirely different from that of 1880 that, if exactly the same establishments had been enumerated at the two censuses, the results could not be compared, and that the totals for 1890 do not show true conditions. If the schedule used at 1890 has resulted in obtaining such a distorted report that it cannot be compared with 1880, it certainly has not secured a true statement of the conditions of industry.

The differences in the schedules used at the two censuses consisted entirely in itemizing the questions contained in the schedule of 1880 and the incorporation of one additional question. The schedule of 1890 was an advance in statistical methods in that it not only developed the full totals, but enabled a presentation that would show all the items of which the totals were composed, so that in the future no question could arise as to the intention of including or excluding certain facts.

The questions concerning employés and wages have been the particular object of criticism. The schedule of 1880 called for the average number of employés—men, women, and children respectively—engaged during the year and the total amount paid as wages. No class of employés was excepted. The evident intention was to secure a complete return of all classes. The schedule of 1890 required the employés—men, women, and children respectively—to be reported in five groups: first, skilled workmen; second, officers and firm members; third, clerks; fourth, unskilled workmen, and, fifth, piece workers. There were other subdivisions of the question at both censuses, but nothing foreign to the inquiry of 1880 was added in 1890, the intention being only to secure a complete and full report. As stated in the census reports, “the tendency of the questions used in 1880 was to obtain a number in excess of the average number of employés, while it is believed the questions used in 1890 obtained the average number. The questions in 1890

also tended to increase the amount of wages as compared with 1880, and secured a more complete return of the officers, firm members, and clerks and their salaries." This is a correct theoretic comparison of the two sets of questions. The actual number of employés and the amount of wages that were reported in answer to the detail question of 1890 and that would not have been reported if the identical question of 1880 had been used, are only a matter of conjecture. An examination of the original reports of 1880 reveals the fact that, to some extent at least, officers, firm members, and clerks, as well as other employés, were reported indiscriminately and one lump sum given as wages for all. It, therefore, would be impossible to say how many, or what proportion of the wages, reported in 1890 should be excluded in order to make an exact comparison with 1880, and manifestly improper to apply an estimate to correct either set of figures so as to satisfy our ideas as to what the true conditions are.

The totals for the two censuses are the results of inquiries designed to develop the same facts; they contain the same elements, and were compiled in many respects by the application of identical methods, and their presentation side by side with the detail figures for 1890 and the full explanatory text given in the final reports are beyond criticism; certainly the charge that they were designed to mislead cannot be substantiated.

It is asserted that the presentation of \$484.49 as the average per capita wages for all classes of employés, or \$444.83 as the average for the employés exclusive of officers, firm members, and clerks, in comparison with \$346.91 for all classes in 1880, is erroneous; also that the division of the total wages by the average number employed is not the correct method of obtaining the average wages.

The comparison with 1880 is not affected by the method of obtaining the average, because that was the same at both censuses. We have seen that all classes were included in 1880, but as the question used in 1890 may have developed a more complete report of officers, firm members, and clerks, this class

with their salaries has been excluded and the average given as \$444.83. Then the only possible factors that entered into this average wage of \$445 for 1890 that would possibly tend to abnormally increase it, as compared with the average of \$347 for 1880, and which could not be eliminated except by the application of an arbitrary estimate, are the more thorough enumeration and the inclusion of additional industries previously referred to and explained ; also a question which required the classes of employés and their wages to be reported separately ; and the greater care, if any, taken in the editing or preparation of the schedules for tabulation.

If we exclude from the totals for 1890 not only the officers, firm members, and clerks, but all the employés and the wages paid in the industries that were possibly omitted or not thoroughly canvassed in 1880, we still have an average annual wage of \$429.47 for 1890. This average is evidently still too high for those who have criticised it, but I do not believe the change in the form of the question has had any material effect on it, for the obvious reason that the total amount paid in wages is the item of all others that the manufacturers were able to report with exactness : it was the item most readily ascertained at both censuses. This being the case, the same total would invariably be given, no matter whether a lump sum was required, as in 1880, or an itemized statement, as in 1890. Then, having eliminated the officers, firm members, and clerks as a class that was possibly more fully reported in 1890, we have left as an abnormal factor, so far as the questions are concerned, that part which related only to the number of employés. In 1880 the greatest, the least, and the average number employed during the year, or the time in operation, were required to be reported. In 1890 the average number only was required to be reported by the classes previously enumerated.

There is a possibility, which is explained fully in the final reports, that the question of 1890 resulted in securing a smaller number of employés than did that of 1880, but if the difference was great enough to make any perceptible difference in the

average wages, it was not detected in the careful examination and comparison made by the census office.

The method of editing or preparing the schedules for tabulation was practically the same at the two censuses, the only changes for 1890 being those necessitated by the individual schedules and the additional checks afforded by the detail questions. Under no circumstances, except when a clerical error was apparent, was the amount reported as wages changed, nor was the number of employés increased or diminished except when an evident error appeared.

The number of employés and the total wages at both censuses are substantially as reported by the enumerators, and the enumerators of 1880 were probably as intelligent as those of 1890. Under these circumstances for the department to apply an arbitrary percentage of correction to either the total or average wages would have been worse than absurd. A personal canvass was not made with the intention of securing results that would be corrected to suit the ideas of anyone concerning the amount paid as wages. The data secured by this canvass have been honestly tabulated and presented. They are the only data that can be relied on as showing the actual facts.

Whether the average, the total, the greatest, or the least number of employés engaged during the year should be taken as the division for the total wages, in order to ascertain the average, is a subject that has received the consideration of the best statisticians of the world, and they have invariably taken the average number. It is needless to discuss it further, but it must be remembered that the wages reported were paid to have certain positions of employment filled, and the number of those positions is probably the true divisor for the total wages; the average comes nearer this number than does the total or the greatest number. But, as carefully explained in the census reports, the average given for wages is not the true average yearly earning per workman. Because of the constant shifting of workmen from one employer to another, and other contingencies enumerated, the only true way to ascertain the exact amount earned during a year is to con-



sult the workman himself and ascertain from him the amount of wages he actually received. When you have obtained this from all the workmen in the country, the total wages may be divided by the total number and the true average earnings ascertained. It is only under such conditions that the total number can be correctly used as a divisor. A similar division may, of course, be made for a representative number, but it will only be a representative average wage. This representative average is the only average that it is practicable to obtain, and it is given in all statistical works on wages.

A serious error is frequently made in the use of census statistics by blending data reported in answer to apparently similar questions, but applied to entirely different lines of investigation. For instance, one writer states: "There is another important factor in this problem entirely overlooked by Colonel Wright. The census reports as adults males over sixteen and females over fifteen, classifying the remainder as children. In ascertaining the age, however, the question asked at the last census called for 'age nearest birthday,' which would include as children males under sixteen and a half, females under fifteen and a half. At the preceding census 'age last birthday' was called for, which would include males to their seventeenth and females to their sixteenth birthday." The census reports that classify as adults males over sixteen and females over fifteen relate entirely to the statistics of manufactures as reported by establishments. The latter portion of the quotation refers to questions contained in the general population schedule. The two have no connection whatever. Colonel Wright had reference entirely to the statistics as reported by manufacturing establishments, and in them the question as to "age nearest birthday" or at "last birthday" did not appear at either census. The writer quoted was endeavoring to criticise the statistics of population, which for 1890 show the number of children in occupations arranged in age-groups of ten to fourteen years, inclusive, instead of ten to fifteen, as at prior censuses. While I was not connected with the compilation of the statistics of population, it appears that the quinquennial age period was

adopted in grouping those engaged in occupations as being the most convenient mode of tabulation, and at the same time showing the actual facts relative to the employment of children. While the age at which children may engage in occupations varies according to the laws of the different states, the majority of the states have fixed the age of non-employment at fourteen, or some year under that age.

The census office has published the total annual value of the products of establishments engaged in the manufacturing and mechanical industries as \$9,372,437,283. It is asserted that this is wrong, and that it should be reduced by \$5,162,044,076, the cost of materials, and the difference \$4,210,393,207 given as the true value of products. This latter sum comes nearer representing the enhanced value of the raw materials, or the value added by the expenditure of capital, labor, and other manufacturing processes. It is the amount added to the wealth of the country by manufacturing processes, but it is not the true value of the products of the manufacturing establishments of the country. One writer criticising these totals even went so far as to say that the two values had been published in official reports as the value of the products of industry, yet one was 66 per cent. greater than the other, and that the public was expected to accept both as showing the same thing. The public will accept nothing of the kind, though the writer referred to may.

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